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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,322	03/25/2004	Thunnakart Boontarika	251000US90	5436

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EXAMINER	
MARKHAM, WESLEY D	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 09/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/808,322	BOONTARIKA ET AL.	
	Examiner	Art Unit	
	Wesley D. Markham	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 July 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Acknowledgement is made of the amendment filed by the applicant on 7/12/2005, in which one (1) replacement sheet of drawings was submitted, Claims 1 – 8 were canceled, and Claims 9 – 14 were added. **Claims 9 – 14** are currently pending in U.S. Application Serial No. 10/808,322, and an Office action on the merits follows.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) (i.e., the certified copy of JP 2003-089529, filed on 3/28/2003), which papers have been placed of record in the file.

Drawings

3. The objection to the drawings set forth in paragraph 3 of the previous Office action (i.e., the non-final Office action mailed on 1/24/2005) is withdrawn in light of the acceptable replacement sheet of drawings filed on 7/12/2005 in which reference number "2" was deleted from Figure 1.

Claim Objections

4. Claim 12 is objected to because the phrase "to form an molded product" in line 3 of the claim contains a potentially confusing typographical error (i.e., the word "an" should be replaced with the word "a").

Claim Observations

5. The rejections under 35 U.S.C. 102 and 103 set forth in paragraphs 4 – 18 of the previous Office action are withdrawn in light of the applicant's amendment to cancel Claims 1 – 8, all of the previously pending claims.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al. (JP 09-012340 A) in view of Hirota et al. (USPN 6,230,520), in further view of

Sato et al. (USPN 5,851,252), and in further view of Mizuno et al. (WO 00/41225) and Yamazaki et al. (USPN 6,228,751).

9. Regarding independent **Claim 9**, Miyazaki et al. teaches a method of manufacturing a glass optical element of a desired shape, comprising press-molding a heat-softened molding material to form a molded product, cleaning the optical glass element (e.g., with an acid or alkali solution) after molding, and then depositing an antireflective film on the surface of the cleaned, molded glass element (Abstract, Figures 1 and 2 (which show the press-molding process), paragraphs [0001], [0004] – [0007], [0013] – [0028], and [0034]). The cleaning process of Miyazaki et al. advantageously allows the subsequently deposited antireflective film to have excellent durability and adhesion to the underlying optical glass element (Abstract). Miyazaki et al. does not explicitly teach that the molding material is prepared by solidifying melt glass into a prescribed shape. Specifically, Miyazaki et al. teaches that the glass molding material "40" supplied to the press mold has a disc-shape or the like (i.e., a "prescribed shape") (paragraph [0023]), but is silent as to how the molding material is prepared. This would have motivated one of ordinary skill in the art to seek-out and utilize an appropriate method to prepare the glass molding material "40" of Miyazaki et al. Hirota et al. teaches that a method of solidifying melt glass is used to produce a glass preform (i.e., a glass molding material) having a prescribed shape (e.g., sphere, disc, etc.), the preform subsequently being used in a press molding process to produce an optical glass element (Col.1, lines 6 – 37, Col.4, line 60 – Col.5, line 47). Therefore, it would have been obvious to one of

ordinary skill in the art to solidify melt glass into a prescribed shape to produce the glass molding material "40" of Miyazaki et al. because such a method would advantageously provide the glass molding material of Miyazaki et al. with a predetermined shape suitable for subsequent press molding, as desired by Miyazaki et al. Miyazaki et al. does not explicitly teach providing a carbon-containing layer on a surface of the solidified glass. However, the overall process of Miyazaki et al. involves press molding an optical glass element (Abstract). Sato et al. teaches that, in the art of press molding an optical glass element (i.e., a process analogous to that of Miyazaki et al.), it is desirable to deposit a carbon film on the surface of the molding material prior to press molding in order to improve the releasability of the mold and the molded article with respect to each other (i.e., preventing the mold and the article from fusing together during the molding process) (Abstract, Col.1, lines 13 – 41, Col.2, lines 58 – 63, Col.3, lines 41 – 50, Col.4, lines 1 – 2 and 50 – 64, and Col.5, lines 1 – 8). After press molding, the carbon film remains on the molded glass optical element (i.e., the solidified glass) but is easily removed from the molded article by, e.g., plasma processing (Col.5, lines 9 – 13 and 35 – 37). Therefore, it would have been obvious to one of ordinary skill in the art to coat the outer surface of the optical glass molding material of Miyazaki et al. with a carbon film prior to press molding, as taught by Sato et al., in order to advantageously improve the releasability of the mold and the molded article with respect to each other (i.e., preventing the mold and the article from fusing together during the molding process), thereby improving the quality of the molded optical product. Sato et al. does not

explicitly teach removing the carbon-containing layer remaining on the molded optical element by UV ozone treatment. Specifically, Sato et al. teaches removing the layer by using a plasma treatment (Col.5, lines 9 – 13). However, Mizuno et al. teaches using UV ozone treatment to remove contaminants from the surface of a glass optical device. Such a process has the advantages of (1) cleaning the optical device in a shorter time than in conventional methods, and (2) reducing damage to the glass material (Abstract). Additionally, Yamazaki et al. teaches that a UV ozone treatment successfully removes carbon-based materials from the surface of a substrate and is preferred over a plasma cleaning process because it does not damage the substrate surface (Col.5, line 47 – Col.6, line 7). Therefore, it would have been obvious to one of ordinary skill in the art to utilize UV ozone treatment to remove the remnants of the carbon-containing film instead of plasma treatment in order to reap the benefits discussed immediately above (i.e., short cleaning time and reduced substrate damage compared to plasma cleaning).

10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al. (JP 09-012340 A) in view of Hirota et al. (USPN 6,230,520), in further view of Sato et al. (USPN 5,851,252), in further view of Mizuno et al. (WO 00/41225) and Yamazaki et al. (USPN 6,228,751), and in further view of Murata et al. (USPN 6,261,665) and Kumagai et al. (USPN 5,392,156).

11. The combination of Miyazaki, Hirota, Sato, Mizuno, and Yamazaki teaches all the limitations of **Claim 10** as set forth above in paragraph 9, except for a method

wherein the UV ozone treatment is carried out so that the surface free energy of the surface of the molded product increases up to at least 60 mJ/m^2. However, Miyazaki et al. is clearly concerned with improving the adhesion of the glass optical element to a subsequently deposited antireflective film (Abstract). Murata et al. teaches that, in the art of producing an antireflective film-coated optical element, it is desirable to treat the transparent substrate (e.g., glass) by, e.g., plasma treatment, corona discharge, alkali treatment, etc., in order to increase the surface energy of the transparent substrate, which improves the adhesion of the substrate to a subsequently deposited antireflective film (Col.4, lines 6 – 61). Murata et al. teaches that the surface energy of the treated substrate should be 50 dyne/cm or more in order to improve the adhesive strength (Col.4, lines 39 – 40). "50 dyne/cm or more" is equivalent to "50 mJ/m^2 or more" (unit conversion specifics omitted). This range of surface energy values taught by Murata et al. overlaps the applicant's claimed range of at least 60 mJ/m^2. Additionally, Kumagai et al. teaches the functional equivalence of plasma treatment, corona treatment, and UV ozone treatment in modifying the surface energy of a glass optical element so that a subsequently deposited antireflective coating has good adhesion to the underlying optical element (Col.1, line 66 – Col.2, line 7; Col.4, line 66 – Col.5, line 11). It would have been obvious to one of ordinary skill in the art to UV ozone treat and clean the press-molded optical element of Miyazaki et al. in order to increase the surface energy of the element to be 50 mJ/m^2 or more (a range that overlaps the applicant's claimed range), as taught by Murata et al., and then coat the optical element having the

aforementioned high surface energy with an antireflective film, with the reasonable expectation of successfully and advantageously improving the adhesive strength of the antireflective film to the optical element, as explicitly desired by Miyazaki et al., due to the high surface energy of the element created by the UV ozone treatment.

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al. (JP 09-012340 A) in view of Hirota et al. (USPN 6,230,520), in further view of Sato et al. (USPN 5,851,252), in further view of Mizuno et al. (WO 00/41225) and Yamazaki et al. (USPN 6,228,751), in further view of Murata et al. (USPN 6,261,665) and Kumagai et al. (USPN 5,392,156), and in further view of Petcen (USPN 4,494,344) and Suzuki et al. (USPN 4,699,640).
13. The combination of Miyazaki, Hirota, Sato, Mizuno, Yamazaki, Murata et al., and Kumagai et al. teaches all the limitations of **Claim 11** as set forth above in paragraph 11, except for a method wherein the optical element obtained by press molding is stored in a clean atmosphere with a cleanliness class of less than or equal to 1,000 prior to formation of the antireflective film. However, Petcan teaches that, in the art of producing glass optical elements such as lenses, the glass should be stored in a clean room between the step of cleaning the glass and subsequent processing steps (Col.1, lines 8 – 10, Col.3, lines 11 – 13). Suzuki et al. teaches that clean rooms having a cleanliness class of 1,000 and 100 (i.e., "less than or equal to 1,000", as claimed by the applicant) were known in the art at the time of the applicant's invention, and the aforementioned cleanliness classes indicate an intermediate and

high degree of cleanliness, respectively (Col.1, lines 6 – 26). In light of these teachings, it would have been obvious to one of ordinary skill in the art to store the press-molded and UV ozone treated / cleaned optical element of Miyazaki et al. in a clean room having a high degree of cleanliness (e.g., a cleanliness class of 1,000 or 100) until it is desired to deposit the antireflective film thereon in order to insure that no dust or other undesired material deposits on the previously cleaned optical element surface and negates the desired effect of the UV ozone treatment (i.e., removing the carbon-containing film remnants from the optical element surface and improving the adhesion of the subsequently deposited antireflective film) by contaminating the surface.

14. Claims 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al. (JP 09-012340 A) in view of Hirota et al. (USPN 6,230,520), in further view of Murata et al. (USPN 6,261,665) and Berenguer et al. (USPN 5,990,013).

15. Regarding **Claims 12 and 14**, Miyazaki et al. teaches a method of manufacturing a glass optical element of a desired shape, comprising press-molding a heat-softened molding material to form a molded product, cleaning the optical glass element (e.g., with an acid or alkali solution) after molding, and then depositing an antireflective film on the surface of the cleaned, molded glass element (Abstract, Figures 1 and 2 (which show the press-molding process), paragraphs [0001], [0004] – [0007], [0013] – [0028], and [0034]). The cleaning process of Miyazaki et al. advantageously allows the subsequently deposited antireflective film to have excellent durability and

adhesion to the underlying optical glass element (Abstract). Miyazaki et al. does not explicitly teach that the molding material is prepared by solidifying melt glass into a prescribed shape. Specifically, Miyazaki et al. teaches that the glass molding material "40" supplied to the press mold has a disc-shape or the like (i.e., a "prescribed shape") (paragraph [0023]), but is silent as to how the molding material is prepared. This would have motivated one of ordinary skill in the art to seek-out and utilize an appropriate method to prepare the glass molding material "40" of Miyazaki et al. Hirota et al. teaches that a method of solidifying melt glass is used to produce a glass preform (i.e., a glass molding material) having a prescribed shape (e.g., sphere, disc, etc.), the preform subsequently being used in a press molding process to produce an optical glass element (Col.1, lines 6 – 37, Col.4, line 60 – Col.5, line 47). Therefore, it would have been obvious to one of ordinary skill in the art to solidify melt glass into a prescribed shape to produce the glass molding material "40" of Miyazaki et al. because such a method would advantageously provide the glass molding material of Miyazaki et al. with a predetermined shape suitable for subsequent press molding, as desired by Miyazaki et al. Additionally, Miyazaki et al. does not explicitly teach evaluating the surface of a sample of the molded product so that the molded product having surface free energy of at least 60 mJ/m^2 is determined prior to depositing the antireflective film thereon (Claim 12), and for the evaluated molded product(s) having a surface free energy of below 60 mJ/m^2, subjecting the molded product to a process of increasing the surface free energy (Claim 14). However, Miyazaki et al. is clearly concerned with improving the

adhesion of the glass optical element to a subsequently deposited antireflective film (Abstract). Murata et al. teaches that, in the art of producing an antireflective film-coated optical element, it is desirable to treat the transparent substrate (e.g., glass) by, e.g., plasma treatment, corona discharge, alkali treatment, etc., in order to increase the surface energy of the transparent substrate, which improves the adhesion of the substrate to a subsequently deposited antireflective film (Col.4, lines 6 – 61). Murata et al. teaches that the surface energy of the treated substrate should be 50 dyne/cm or more in order to improve the adhesive strength (Col.4, lines 39 – 40). "50 dyne/cm or more" is equivalent to "50 mJ/m^2 or more" (unit conversion specifics omitted). This range of surface energy values taught by Murata et al. overlaps the applicant's claimed range of at least 60 mJ/m^2. However, Murata et al. is silent regarding how one determines the surface energy of the treated substrate. Berenguer et al. teaches that, in the art of treating (e.g., plasma treating) the surface of a substrate to alter the surface energy thereof prior to the deposition of a film thereon, it is desirable to evaluate the surface energy of the treated substrate and then repeat the treatment process if necessary (i.e., if the surface energy has not reached the optimum value). Such an algorithm provides fast feedback and control of the pretreatment step (Abstract, Col.1, line 45 – Col.2, line 53; Col.3, line 61 – Col.5, line 24). Therefore, it would have been obvious to one of ordinary skill in the art to evaluate the surface of a sample of the molded product of Miyazaki et al. so that the molded product having surface free energy of at least 60 mJ/m^2 is determined prior to depositing the antireflective film thereon, and for the evaluated

molded product(s) having a surface free energy of below 60 mJ/m^2, subject the molded product to a process of increasing the surface free energy, in order to obtain the benefits of (1) improving the adhesive strength of the antireflective film to the optical element, as explicitly desired by Miyazaki et al., due to the high surface energy of the element, and (2) insuring that the optical element has the required high surface energy prior to coating by implementing the surface energy evaluation process taught by Berenguer et al.

16. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al. (JP 09-012340 A) in view of Hirota et al. (USPN 6,230,520), in further view of Murata et al. (USPN 6,261,665) and Berenguer et al. (USPN 5,990,013), and in further view of Kumagai et al. (USPN 5,392,156).

17. The combination of Miyazaki et al., Hirota, Murata, and Berenguer teaches all the limitations of **Claim 13** as set forth above in paragraph 15, except for a method wherein UV ozone treatment is used to increase the surface free energy of the molded product. However, doing so would have been obvious to one of ordinary skill in the art based on the further teachings of Kumagai et al. as set forth above in paragraph 11.

Response to Arguments

18. Applicant's arguments filed on 7/12/2005 have been fully considered but they are not persuasive. Specifically, the applicant's arguments are moot in view of the new grounds of rejection set forth above.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. He et al. (USPN 6,715,316) is cited to show that a clean glass surface is known in the art to have a high surface energy (Col.10, lines 42 – 55).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D. Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wesley D Markham
Examiner
Art Unit 1762

WDM

TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER